

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(PCT Rule 71.1)

Date of mailing  
(day/month/year)

13.04.2006

Applicant's or agent's file reference

~~12-37428-WO~~

**IMPORTANT NOTIFICATION**

International application No.

PCT/US2004/004011

International filing date (day/month/year)

11.02.2004

Priority date (day/month/year)

11.02.2004

Applicant

BAKER HUGHES INCORPORATED

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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Name and mailing address of the international  
preliminary examining authority:



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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

|   |  |  |
|---|--|--|
| Applicant's or agent's file reference<br>194-37438-WO   | <b>FOR FURTHER ACTION</b><br>See Form PCT/PEA416   |  |
| International application No.<br>PCT/US2004/004011  | International filing date (day/month/year)<br>11.02.2004   | Priority date (day/month/year)<br>11.02.2004 |
| International Patent Classification (IPC) or national classification and IPC<br>INV. C10G29/20 C10L1/22 C10L1/18  |  |  |
| Applicant<br>BAKER HUGHES INCORPORATED  |  |  |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> |  |  |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>  |  |  |
| Date of submission of the demand<br><br>26.08.2005  | Date of completion of this report<br><br>13.04.2006  |  |
| Name and mailing address of the international preliminary examining authority:<br><br> European Patent Office - P.B. 5818 Patentlaan 2<br>NL-2280 HV Rijswijk - Pays Bas<br>Tel. +31 70 340 - 2040 Tx: 31 651 epo nl<br>Fax: +31 70 340 - 3016   | Authorized officer<br><br>Gilliquet, J-N<br><br>Telephone No. +31 70 340-<br><br> |  |

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

AP20 Rec'd PCT/2004/004011 03 AUG 2006  
International application No.  
PCT/US2004/004011

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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-13 as originally filed

**Claims, Numbers**

1-25 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/004011

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

|                               |             |                     |
|-------------------------------|-------------|---------------------|
| Novelty (N)                   | Yes: Claims | 3,10,12,13,15,16-25 |
|                               | No: Claims  | 1,2,4-9,11,14       |
| Inventive step (IS)           | Yes: Claims | 16-25               |
|                               | No: Claims  | 1-15                |
| Industrial applicability (IA) | Yes: Claims | 1-25                |
|                               | No: Claims  |                     |

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

10/588341

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

AP20 Rec'd PCT/US2004/004011  
12 AUG 2006

**Re Item V.**

- 1 The following documents are referred to in this communication:  
D1 : US 4 734 525 A (GREEN MICHAEL J) 29 March 1988 (1988-03-29)  
D2: WO 98/02501 A (BAKER HUGHES INC) 22 January 1998 (1998-01-22)

Taking into account the conclusions of Point VIII below, the search and examination have been limited to mixtures of following compounds:

Compound (A) :

1,4-diazabicyclo(2.2.2)octane, 1,8-diazabicyclo(5.4.0)undec-7-ene,  
1,5-diazabicyclo(4.3.0)non-5-ene and mixtures thereof

Compound (B) : epoxides.

**2 INDEPENDENT CLAIM 1**

- 2.1 The subject-matter of independent claim 1 is not new in the sense of Article 33(2) PCT, and therefore the criteria of Article 33(1) PCT are not met.

Ex. 1-3 and 5-8 of Document D1 disclose compositions comprising  
1,8-diazabicyclo(5.4.0)undec-7-ene and 1,5-diazabicyclo(4.3.0)non-5-ene in  
mixture with propylene oxide and butene oxide.

Dependent claims 2-15 do not contain any features which, in combination with the features of claim 1 meet the requirements of the PCT in respect of novelty and/or inventive step.

**3 INDEPENDENT CLAIMS 16 AND 23**

- 3.1 The document D2 is regarded as being the closest prior art to the subject-matter of claims 16 and 23, and shows (see p. 3 l.9-14 and cl. 1,3 of D2) the use of bisoxazolidine in a method of reducing the concentration of mercaptans in a hydrocarbon.

The subject-matter of claims 16 and 23 differs from this known method in that

another compound is used to this effect.

The subject-matter of claims 16 and 23 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as how to provide an alternative to the process of reducing the concentration of mercaptans in hydrocarbons.

The solution to this problem proposed in claims 16 and 23 of the present application is considered as involving an inventive step (Article 33(3) PCT) because none of the documents of the prior art on file discloses the use of diazabicyclo compounds in mixture with epoxides for reducing the concentration of mercaptans in hydrocarbons nor gives a hint to the effect of this use.

Claims 17-22, 24 and 25 are dependent on claims 16 or 23 and as such also meet/s the requirements of the PCT with respect to novelty and inventive step.

**Re Item VIII.**

Present claims 1, 4, 16 and 23 relate to an extremely large number of possible compounds. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the compounds :

Compound (A) :

1,4-diazabicyclo(2.2.2)octane, 1,8-diazabicyclo(5.4.0)undec-7-ene,  
1,5-diazabicyclo(4.3.0)non-5-ene and mixtures thereof

Compound (B) : epoxides,

those compounds prepared in the examples and closely related homologous compounds.